## REMARKS

1. Information Disclosure Statement

The Information Disclosure Statement filed on December 14, 2001 was only partially considered. Accordingly, Applicant submits herewith a Supplemental Information Disclosure Statement identifying those references that were previously not considered, together with a translation of each abstract, which provides the concise explanation of the relevance of those references as best understood by the undersigned.

2. Specification

Paragraphs **[01]** and **[63]** have been amended to provide application numbers that were not available at the time of filing the application.

3. Claims

Claims 1 – 20, 22, and 23 have been examined. Claims 15 – 17, 23, and 24 stand rejected under 35 U.S.C. §112, ¶2; Claims 1 – 3, 9 – 12, 18, 23, and 24 stand rejected under 35 U.S.C. §102(b) as anticipated by U.S. Pat. No. 6,154,582 ("Bazylenko"); Claims 4 – 7, 13 – 15, and 20 stand rejected under 35 U.S.C. §103(a) as unpatentable over Bazylenko; Claim 8 stands rejected under 35 U.S.C. §103(a) as unpatentable over Bazylenko in view of U.S. Pat. No. 6,451,686 ("Ngai"); Claims 9 – 11 stand rejected under 35 U.S.C. §103(a) as unpatentable over Bazylenko in view of U.S. Pat. No. 4,856,859 ("Imoto") and optionally in view of U.S. Pat. No. 6,705,124 ("Zhong"); Claim 12 stands rejected under 35 U.S.C. §103(a) as unpatentable over Bazylenko and Imoto, and optionally in view of Zhong, in further view of U.S. Pat. No. 4,557,561 ("Schneider"); Claims 13 – 16 stand rejected under 35 U.S.C. §103(a) as unpatentable over Bazylenko in view of U.S. Pat. No. 6,194,038 ("Rossman"); and Claims 17 and 19 stand rejected under 35 U.S.C. §103(a) as unpatentable over Bazylenko in view of Rossman and/or U.S. Pat. No. 6,122,934 ("Narita").

i. §112 Rejections

Applicant thanks the Examiner for a careful review of the claims and has amended Claims 15 – 17 and 23 accordingly. These amendments are made solely for purposes of clarification and do not narrow the scope of the claims.

ii. Prior-art Rejections

The independent claims have been amended to recite that a plurality of separated optical cores are formed over the undercladding layer to define a sequence of gaps, and that the uppercladding layer is deposited with an HDP process that has a deposition to sputter ratio in the range of 3:1 – 10:1 (*see* Application, p. 20, ll. 2 – 14). It is respectfully believed that the combination of limitations now recited in the independent claims is neither taught nor suggested by the cited references, either alone or in combination.

In particular, the principal reference relied on in the Office Action, Bazylenko, is concerned primarily with the use of PECVD for fabricating an electro-optical device in a method that avoids the use of an oxygen precursor that does not include nitrogen (Bazylenko, Col. 2, ll. 25 – 30). While Bazylenko does occasionally mention the use of a high-density plasma process, it does so only in the context of identifying alternative plasma deposition processes that may be used in avoiding the need for a nitrogenated oxygen precursor (*see, e.g., id.*, Col. 6, ll. 15 – 20). There is no teaching or recognition of any aspect of such a high-density process that would have any benefit over the use of a more conventional low-density plasma process that is the principal focus of Bazylenko.

Bazylenko clearly does not anticipate the independent claims as now recited because it neither teaches nor suggests the formation of a plurality of optical cores nor the specifically recited plasma-deposition characteristics. In addition, there is no motivation to modify Bazylenko in the manner claimed. In rejecting claims that previously recited the formation of a plurality of cores, the Office Action cited Narita and Rossman.

First, while Narita discloses the formation of multiple cores, it recognizes that a particular difficulty with forming multiple cores is in filling gaps between the cores without the formation of a void (Narita, Col. 5, ll. 10 – 14). The solution to this problem taught by Narita is to use a thermal process that requires heating to about 1100 °C for about two hours, in addition

to pressurizing the layers (*id.*, Col. 5, ll. 30 – 45). Such a teaching is directly contrary to the teachings of Bazylenko, which cautions that temperatures on the order of 1000 °C that are used as part of an annealing step in conventional optical-device fabrication are highly detrimental (*see id.*, Col. 2, ll. 1 – 5; Col. 3, ll. 16 – 22). Narita instead teaches that temperatures be maintained on the order of 250 – 300 °C (*e.g., id.*, Col. 6, ll. 59 – 63). Thus, Narita teaches away from the combination, a factor long recognized as indicating that the combination is *not* obvious. Furthermore, to combine Narita with Bazylenko would render Bazylenko unsatisfactory for its intended purpose by using excessively high temperatures, a factor that has also been recognized as demonstrating a lack of motivation to make the proposed combination (*see* MPEP 2143.01).

Second, Rossman is not at all concerned with optical applications, but is instead concerned with purely electronic applications (*e.g.*, Rossman, Col. 1, ll. 5 – 6). The scale of optical and electronic applications is significantly different so that there is no motivation to apply teachings relevant to electronic applications to problems arising with optical applications (*see generally*, Application, p. 5, ll. 21 – 26). For example, Bazylenko is directed to applications in which the optical cores have dimensions of 4.5-μm square; similarly Narita teaches optical core dimensions of about 8-μm square. These dimensions are about an order of magnitude larger than the < 0.5-μm depth of the structures described in Rossman (Rossman teaches feature sizes of about 0.18 μm (Rossman, Col. 1, ll. 14 – 17) with aspect ratios of about 2.5:1 (*id.*, Col. 2, ll. 50 – 54)). There is no reason to expect the deposition conditions for such very different geometric features to be similar, and this is indeed reflected by the teachings of Rossman. This is evident from the manner in which the simultaneous deposition and sputtering character of a high-density plasma are described. In particular, the claims now recite a deposition-sputter ratio in the range of 3:1 – 10:1, which is noted in the application as being suitable for deposition of optical-scale structures (Application, p. 20, ll. 2 – 14). Rossman uses a different measure for the deposition-sputter ratio[1], which when converted to the same measure recited in the claims corresponds to a deposition-sputter ratio in the range of about 2.4:1 – 2.6:1 (Rossman, Col. 20, ll. 42 – 60). There is, thus, no overlap in the deposition conditions, reflecting the different considerations applicable to electronic and optical applications. It is further noted that Bazylenko provides no recognition

[1] The deposition-sputter ratio is defined in the Application and claims as a ratio of the sum of the net deposition rate and blanket sputtering rate to the blanket sputtering rate (Application, p. 7, l. 6). Rossman uses a related measure described as a "deposition-etch" ratio equal to the ratio of the blanket deposition rate to the difference between the blanket deposition rate and net deposition rate (Rossman, Col. 12, l. 47).

of the simultaneous deposition and sputtering that is a hallmark of high-density plasma processes, consistent with its lack of contemplation of gapfilling issues.

Thus, not only has no motivation been established to apply teachings from electronic-device fabrication arts to an optical-device fabrication issue, the cited teachings do not disclose the specific plasma characteristics now claimed.

iii. Other Amendments

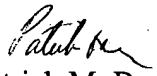
Certain other amendments have been made to some dependent claims for purposes of clarification. In particular, claims that recited ranges "between" a value of zero and another value were construed in the Office Action as including the zero value. The language has been amended to clarify that the range is intended to include only finite values so the ranges are now recited as a nonzero value less than the other (upper) value.

## CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 303-571-4000.

Respectfully submitted,



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